

CLAIMS

1. A lithium ion capacitor comprising a positive electrode, a negative electrode and an aprotic organic solvent solution of a lithium salt as an electrolytic solution, wherein a positive electrode active material is a material capable of reversibly supporting lithium ions and/or anions, a negative electrode active material is a material capable of reversibly supporting lithium ions, and the potential of the positive electrode is at most 2.0 V after the positive electrode and the negative electrode are short-circuited, characterized in that the positive electrode and the negative electrode are respectively made by forming electrode layers by the positive electrode active material and the negative electrode active material on both sides of a positive electrode current collector and a negative electrode current collector each having pores penetrating from the front surface to the back surface, the capacitor has such a cell structure that the positive electrode and the negative electrode are wound or laminated, and the outermost portion of the wound or laminated electrodes is the negative electrode.

2. The lithium ion capacitor according to Claim 1, wherein lithium ions are preliminarily supported by the negative electrode and/or the positive electrode by electrochemically contact with a lithium ion supply source disposed to face the negative electrode with the

negative electrode and/or the positive electrode.

3. The lithium ion capacitor according to Claim 1 or 2, wherein when the cell comprises at least two electrode laminate units having the positive electrode and the negative electrode wound or laminated, the outermost portion of the electrode laminate units is the negative electrode.

4. The lithium ion capacitor according to Claim 1, 2 or 3, wherein the positive electrode active material is any one of (a) an activated carbon, (b) an electrically conductive polymer and (c) a polyacenic organic semiconductor (PAS) which is a heat-treated aromatic condensed polymer, having a polyacenic skeleton structure having an atomic ratio of hydrogen atoms/carbon atoms of from 0.05 to 0.50.

5. The lithium ion capacitor according to any one of Claims 1 to 4, wherein the negative electrode active material is any one of (a) graphite, (b) hardly graphitizable carbon and (c) a polyacenic organic semiconductor (PAS) which is a heat-treated aromatic condensed polymer, having a polyacenic skeleton structure with an atomic ratio of hydrogen atoms/carbon atoms of from 0.05 to 0.50.

6. The lithium ion capacitor according to any one of Claims 1 to 5, wherein the capacitance per unit weight of the negative electrode active material is at least three times the capacitance per unit weight of the positive

electrode active material, and the weight of the positive electrode active material is larger than the weight of the negative electrode active material.